

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claim(s) 3-4, 10, 11 & 14-18** are rejected under 35 U.S.C. 103(a) as being unpatentable over (US-2001/0045593) by De Leeuw et al (“De Leeuw”) in view of (US-2002/0105058) by Tuttle.

**Regarding claims 3 & 4**, De Leeuw discloses in FIG. 5 and related text (**NOTE**: the device of FIG. 5 is *arbitrarily* drawn with layer 41 on the bottom, and layer 1 on top; therefore, for the purposes of this rejection, look at FIG. 5 upside-down), e.g., a semiconductor device comprising:

a substrate (11),

an integrated circuit including a thin film transistor (20),

an antenna having a conducting wire (40), and

a first insulating film (or insulating film in claim 4) (49) covering the conducting wire and the thin film transistor (directly contacts both; hence, “covering”), and

a second insulating film (or a resin film in claim 4) (41) comprising at least one selected from the group of polyimide, epoxy, acryl and polyamide (in the instant case, polyimide) over the first insulating film covering the conducting wire and the integrated circuit (see the FIG. 5

upside down; 41 is over everything), wherein the integrated circuit and the antenna are formed over the substrate to be electrically connected to each other (they are connected to each other).

De Leeuw does not disclose “particles comprising a soft magnetic material are included in the second insulating film” (or resin film in claim 4).

Tuttle discloses in FIG. 6 and related text, **e.g.**, particles comprising a soft magnetic material are included in the second insulating film (110; see paragraph 26; nickel, iron or cobalt in polyimide).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of De Leeuw with “particles comprising a soft magnetic material are included in the second insulating film”, in order to provide for electromagnetic shielding (Title, Abstract and Brief Summary).

Alternatively, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of De Leeuw with teachings of Tuttle, since combining prior art elements (De Leeuw’s polyimide insulation layer AND particles comprising a soft magnetic material of De Leeuw) according to known methods (as explained by De Leeuw) to yield predictable results (electromagnetic shielding, according to De Leeuw) is considered obvious to one of ordinary skill in the art.

Alternatively, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of De Leeuw with teachings of Tuttle, since substitution of one known element (top polyimide layer of De Leeuw) for another known equivalent element (top polyimide layer of Tuttle; now containing particles) resulting in the predictable result

(electromagnetic shielding for the device) is considered obvious to one of ordinary skill in the art.

Please note that the reference to Fujieda, cited in previous rejections, also teaches the importance of absorption of electromagnetic radiation.

**Regarding claim 10**, De Leeuw discloses in FIG. 5 and related text, e.g., the integrated circuit and the antenna are formed over a flexible substrate (the substrate is polysulfon; it is an organic material which is flexible when compared to a diamond substrate).

**Regarding claim 11**, De Leeuw discloses in FIG. 5 and related text, e.g., the conducting wire (as explained above).

Regarding the process limitations recited in claim 11 (“formed by an electroplating method, an electroless plating method, a printing method, or a droplet discharging method”), these would not carry patentable weight in this claim drawn to a structure, because distinct structure is not necessarily produced.

Note that a “product by process” claim is directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wertheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and *In re Marosi et al.*, 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a “product by process” claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in “product by process” claims or not. Note that the applicant has the burden of proof in such cases, as the above case law makes clear.

**Regarding claim 14**, the combination of De Leeuw and Tuttle discloses the soft magnetic material is Fe; Co; Ni; an alloy including at least one of Fe, Co, and Ni;  $3Y2O3.5Fe2O3$  (YIG);  $Fe2O3$ ; Fe-Si-Al alloy; Fe-Cr alloy; FeP alloy; a permalloy in which Ni or Ni-Fe alloy is added with at least one of Mo, Cu, Cr, and Nb; or a soft ferrite (see paragraph 26 of Tuttle).

**Regarding claims 15-18**, the combination of De Leeuw and Tuttle discloses in cited figures and related text, **e.g.**, wherein the antenna is provided over the integrated circuit (see FIG. 5 of De Leeuw, upside-down, as was explained above).

3. **Claim(s) 12 & 13** are rejected under 35 U.S.C. 103(a) as being unpatentable over (US-2001/0045593) by De Leeuw et al (“De Leeuw”) and (US-2002/0105058) by Tuttle as applied to claim(s) 1 above, and further in view of (JP-10-135040) by Urano et al (“Urano”; part of Applicant’s IDS; hence, not mentioned on Notice of References, and no translation is provided).

**Regarding claim 12**, De Leeuw and Tuttle disclose in cited figures and related text, **e.g.**, substantially the entire claimed structure, as recited in claim(s) 1, except “the conducting wire includes a first conductor and a second conductor covering the first conductor”.

In other words, the prior art device teaches a single layer antenna and claim 12 requires a two layered antenna. However, Urano fixes the deficiency.

Urano discloses in FIG. 1(a and b) and related text, **e.g.**, the conducting wire includes a first conductor (5a) and a second conductor (5b) covering the first conductor.

It would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the device of De Leeuw and Tuttle with “the conducting wire includes a first

conductor and a second conductor covering the first conductor” in order to provide for a much bigger antenna in the same die area (twice as much metal in the same amount of die space).

**Regarding claim 13**, the combination of De Leeuw, Tuttle and Urano discloses, e.g., the second conductor (as explained above).

Regarding the process limitations recited in claim 13 (“formed by an electroplating method, an electroless plating method, or a droplet discharging method”), these would not carry patentable weight in this claim drawn to a structure, because distinct structure is not necessarily produced.

Note that a “product by process” claim is directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See also In re Brown, 173 USPQ 685; In re Luck, 177 USPQ 523; In re Fessmann, 180 USPQ 324; In re Avery, 186 USPQ 161; In re Wertheim, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); and In re Marosi et al., 218 USPQ 289, all of which make it clear that it is the patentability of the final product per se which must be determined in a “product by process” claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in “product by process” claims or not. Note that the applicant has the burden of proof in such cases, as the above case law makes clear.

4. **Claim(s) 8, 9, 19 & 20** are rejected under 35 U.S.C. 103(a) as being unpatentable over (US-2001/0045593) by De Leeuw et al (“De Leeuw”) in view of (US-2002/0105058) by Tuttle and further in view of (US-2003/0234294) by Uchihiro et al (“Uchihiro”).

**Regarding claims 8 & 9**, De Leeuw discloses in FIG. 5 and related text (NOTE: the device of FIG. 5 is *arbitrarily* drawn with layer 41 on the bottom, and layer 1 on top; therefore,

for the purposes of this rejection, look at FIG. 5 upside-down), e.g., a semiconductor device comprising:

- a substrate (11),
- an integrated circuit including a thin film transistor (20),
- an antenna having a conducting wire (40), and
- a first insulating film (or insulating film in claim 9) (41) covering the conducting wire and the thin film transistor (it is above both; hence, "covering"),

wherein the integrated circuit and the antenna are formed over the substrate to be electrically connected to each other (they are connected to each other).

De Leeuw does not disclose "a second insulating film (or a resin film in claim 9) comprising at least one selected from the group of polyimide, epoxy, acryl and polyamide over the integrated circuit and at least adjacent to a side of the conducting wire by interposing the first insulating film therebetween" and "particles comprising a soft magnetic material are included in the second insulating film" (or resin film in claim 4).

In short, De Leeuw fails to teach a two layer polyimide substrate that would read on the "second insulating layer" (De Leeuw teaches a single layer polyimide substrate instead) and De Leeuw fails to teach a conductive particle inside that second insulating film. However, Uchihiro and Tuttle, respectively, fix the above two deficiencies.

Uchihiro discloses in FIG. 5(a) and related text, e.g., a two layer polyimide substrate (21; see paragraph 118; it lists polyimide as one of the substrate materials; it also teaches "at least two layer laminated bodies thereof"; to verify that the "two layer laminated" refers to polyimide also,

compare to the wording of paragraph 163 which is slightly different; therefore, 21 can be two layers of polyimide one laminated on the other).

Tuttle discloses in FIG. 6 and related text, **e.g.**, particles comprising a soft magnetic material are included in the second insulating film (110; see paragraph 26; nickel, iron or cobalt in polyimide).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of De Leeuw with “a two layer polyimide substrate” and “particles comprising a soft magnetic material are included in the second insulating film”, in order to further adjust the properties of the device (a two layer polyimide substrate will behave mechanically differently from a single layer polyimide device) and in order to provide for electromagnetic shielding (Title, Abstract and Brief Summary), respectively.

Alternatively, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of De Leeuw with teachings of Uchihiro, since substitution of one known element (a single layer polyimide substrate) for another known equivalent element (a two layer polyimide substrate; it is known equivalent because Uchihiro teaches so) resulting in the predictable result (a functional substrate) is considered obvious to one of ordinary skill in the art.

Alternatively, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of De Leeuw with teachings of Uchihiro, since choosing from finite number of predictable solutions (as evidenced by Uchihiro) to yield result suitable for the task (a substrate) is considered obvious to one of ordinary skill in the art.

Alternatively, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of De Leeuw with teachings of Tuttle, since combining prior art elements (De Leeuw's polyimide insulation layer AND particles comprising a soft magnetic material of De Leeuw) according to known methods (as explained by De Leeuw) to yield predictable results (electromagnetic shielding, according to De Leeuw) is considered obvious to one of ordinary skill in the art.

Alternatively, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the device of De Leeuw with teachings of Tuttle, since substitution of one known element (top polyimide layer of De Leeuw) for another known equivalent element (top polyimide layer of Tuttle; now containing particles) resulting in the predictable result (electromagnetic shielding for the device) is considered obvious to one of ordinary skill in the art.

When teachings of Uchihiro are applied to the device of De Leeuw (so, instead of a single-layer polyimide substrate 41, there is a two-layer substrate 41), it will result in "a second insulating film (or a resin film in claim 9) (the outside one of the two polyimide substrates) comprising at least one selected from the group of polyimide, epoxy, acryl and polyamide over the integrated circuit and at least adjacent to a side of the conducting wire by interposing the first insulating film therebetween" (the first polyimide substrate would be between the second polyimide substrate and the integrated circuit and the antenna, thus meeting the limitations of the claim).



**Regarding claims 19 & 20**, the combination of De Leeuw, Tuttle and Uchihiro discloses in cited figures and related text, e.g., wherein the antenna is provided over the integrated circuit (see FIG. 5 of De Leeuw, upside-down, as was explained above).

***Response to Arguments***

Applicant's arguments filed 1/25/11 have been fully considered but they are not persuasive.

The applicant alleges that one of ordinary skill would not consider protective layer 49 to be covering the conductive wires, because layer 49 is beneath the elements in the construed orientation. Furthermore the applicant provides evidence that the term "cover" means over. The examiner disagrees. The examiner notes that the term "cover" not only encompasses the term over it also encompasses the terms surround or around. (As evidence the Bing definition #4 of cover notes "be wrapped around something; to be lying over or wrapped around to provide warmth". Also the Merriam Webster Definition 2b discloses "cover" to mean envelop.) The examiner notes that layer 49 is around (envelops) the conducting wire and the thin film transistor. The examiner notes the applicant could easily amend the broad language of "cover" to less expansive term such as "over". Lastly MPEP 2111.01 notes "Though understanding the claim language may be aided by explanations contained in the written description, it is important not to import into a claim limitations that are not part of the claim. For example, a particular embodiment appearing in the written description may not be read into a claim when the claim language is broader than the embodiment." *Superguide Corp. v. DirecTV Enterprises, Inc.*, 358 F.3d 870, 875, 69 USPQ2d 1865, 1868 (Fed. Cir. 2004)."

***Allowable Subject Matter***

Claims 1 and 2 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: the prior art of record neither teaches nor suggests a substrate, an integrated circuit including a thin film transistor, an antenna having a conducting wire comprising a first portion and a second portion defining a gap therebetween, and an insulating film comprising at least one selected from the group of polyimide, epoxy, acrylic and polyamide over the conducting wire and the integrated circuit to fill the gap between the first portion and the second portion, wherein the integrated circuit and the antenna are formed over the substrate to be electrically connected to each other, and particles comprising a soft magnetic material are included in the insulating film (claim 1) and a substrate, an integrated circuit including a thin film transistor, an antenna having a conducting wire comprising a first portion and a second portion defining a gap therebetween, and a resin film comprising at least one selected from the group of polyimide, epoxy, acrylic and polyamide over the conducting wire and the integrated circuit to fill the gap between the first portion and the second portion, wherein the integrated circuit and the antenna are formed over the substrate to be electrically connected to each other, and particles comprising a soft magnetic material are included in the resin film (claim 2).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BRADLEY K. SMITH whose telephone number is (571)272-1884. The examiner can normally be reached on 10 am-6 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim Nguyen can be reached on 571-272-2402. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/BRADLEY K SMITH/  
Primary Examiner, Art Unit 2894